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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/970,763	10/05/2001	Koji Suzuki	110596	1925

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EXAMINER

KEBEDE, BROOK

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 06/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/970,763

Applicant(s)

SUZUKI, KOJI

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of the Group II invention, claim(s) 9-22 in Paper No. 6, filed on April 10, 2003, is acknowledged. The traversal is on the ground(s) that "The method claims merely recites the operation of the apparatus claim 1. Any other method which also operated the apparatus claim 1, would fall within the scope of the method claim 1 ...the subject matter of all claims is sufficiently related that a throughout search for the subject matter of any one Group claims would encompass a search for the subject matter of the remaining claims ...". This is not found persuasive.

A restriction requirement between one set of apparatus claims and a set of process claims was issued in the Office action of Paper No.5, mailed on March 10, 2003. "Section 121 [of Title 35 USC] permits a restriction for 'independent and distinct inventions,' which the PTO construes to mean that the sets of claims must be drawn to separately patentable inventions." See *Applied Materials Inc. v. Advanced Semiconductor Materials* 40 USPQ2d 1481, 1492 (Fed. Cir. 1996)(Archer, C.J., concurring in-part and dissenting in-part). An apparatus and the process of making the product using the apparatus are "two independent, albeit related inventions." See *In re Taylor*, 149 USPQ 615, 617 (CCPA 1966). "When two sets of claims filed in the same application are patentably distinct or represent independent inventions, the examiner is to issue a restriction requirement." See *In re Berg*, 46 USPQ2d 1226, 1233 n.10 (Fed. Cir. 1998).

The examiner, in issuing a restriction requirement, must demonstrate "one way distinctiveness." *Applied Materials Inc.* at 1492. As stated within the restriction requirement, "inventions are distinct if either or both of the following can be shown: (1) the process as

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claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)).” In this application, the examiner restricted the apparatus claims from the process claims on the grounds that “the product as claimed can be made by another and materially different process such as a process wherein the apparatus bias source can be used to generate plasma that can be used to treat a substrate (i.e., for a surface treatment of a particular film) instead of to generate plasma to process a substrate (i.e., for etching the film, such as silicon nitride film),” and that, as a result, a restriction was necessary.

In addition to one-way distinctiveness, the examiner must show “why it would be a burden to examine both sets of claims.” *Applied Materials Inc.* at 1492. “A serious burden on the examiner may be *prima facie* shown if the examiner shows by appropriate explanation either separate classification, separate status in the art, or a different field of search.” MPEP 803. An explanation was provided in the restriction requirement. Specifically, in addition to being distinct, the examiner indicated that restriction is proper because the apparatus claims and the process claims “have acquired a separate status in the art.”

The criteria of distinctness and burdensomeness have been met, as demonstrated hereinabove. Accordingly, the restriction requirement in this application is still deemed proper and is therefore **made FINAL**.

Claims 1-9 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention, the requirement having been traversed in Paper No 6.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Change the title to --METHOD FOR MONITORING DEPOSITION REACTION DURING PROCESSING THE SURFACE OF A SEMICONDUCTOR SUBSTRATE--.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 10-12 and 15-22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Although an attempt has been made to identify all instances of claim language non-compliance, such identification is extremely burdensome due to the large number of instances. Examples are provided herein below. Since such noncompliance confuses the claims to the extent that not all of the problems are ready apparent, then upon amendment, if an alternative interpretation of claim language requires a change in the rejection, the new rejection may properly made final.

Claim 10 recites the limitation " monitoring the bias voltage and **a ground current** that flows from the plasma to the inner wall of the chamber to produce a control signal" in lines 10-11.

Since there is not support for the "ground current" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "ground current" is formed.

Claim 15 recites the limitation "monitoring the bias voltage and **a ground current** that flows from the plasma to the inner wall; and when the bias voltage is outside of a first selected range and **the ground current** is outside of a second selected range, changing the first electric power" in lines 12-15.

Since there is not support for the "ground current" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "ground current" is formed.

Claim 18 recites the limitation "**depositing reaction products** on the inner wall of the chamber, **the reaction products** deposited on the inner wall having an influence on the plasma; monitoring an, amount of **the reaction products** deposited on the inner wall by monitoring the bias voltage; and controlling the first electric power to compensate the influence of **the reaction products**, including decreasing the first electric power when an increase in the amount of **the reaction products** is monitored, and increasing the first electric power when a decrease in the amount of the reaction products is monitored" in lines 11-18.

Since there is not support for the "reaction products" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks

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clarity because it is confusing that how the "reaction products" are formed since only single gas is utilized to from plasma.

Claim 19 recites the limitation "wherein the monitoring monitors the amount **of the reaction products** by monitoring the bias voltage and **a ground current** that flows from the plasma to the inner wall" in lines 1-3.

Since there is not support for the "ground current" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "ground current" is formed.

Claim 19 recites the limitation "**depositing reaction products** on the inner wall of the chamber, **the reaction products** deposited on the inner wall having an influence on the plasma; monitoring an, amount of **the reaction products** deposited on the inner wall by monitoring the bias voltage; and controlling the first electric power to compensate the influence of **the reaction products**, including decreasing the first electric power when an increase in the amount of **the reaction products** is monitored, and increasing the first electric power when a decrease in the amount of the reaction products is monitored" in lines 11-18.

Since there is not support for the "reaction products" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "reaction products" are formed since only single gas is utilized to from plasma.

Claim 21 recites the limitation "**depositing reaction products** on the inner wall of the chamber; and **measuring a ground current** that flows from the plasma to the inner wall of the chamber on which **the reaction products are deposited**" in lines 6-8.

Since there is not support for the "reaction products" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "reaction products" are formed since only single gas is utilized to from plasma.

Since there is not support for the "ground current" in the preceding limitations, and there is insufficient antecedent basis for this limitation in the claim. In addition, the claim lacks clarity because it is confusing that how the "ground current" is formed.

Claims 11, 12, 16, 17, 19, 20, and 22 are also rejected as being dependent of the rejected independent base claim.

6. Applicant's cooperation is requested in reviewing the claims structure to ensure proper claim construction and to correct any subsequently discovered instances of claim language noncompliance. See *Morton International Inc.*, 28USPQ2d 1190, 1195 (CAFC, 1993).

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 13, 14, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Tamura (US/6,283,130).

Re claim 13, Tamura discloses a method for processing a surface of a substrate, comprising: holding the substrate (40) on a substrate holder in a chamber (101), the chamber (101) including an inner wall (not labeled); generating a plasma (not labeled) by supplying first electromagnetic waves with a first electric power to a gas atmosphere within the chamber (101) (see Figs. 1 and 4; Col. 3, lines 53-54); applying a bias voltage to the substrate (40) by supplying

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second electromagnetic waves with a second electric power to the substrate holder (4) so that the surface of the substrate is processed by charged species in the plasma accelerated by the bias voltage; controlling the first electric power, including increasing the first electric power when the bias voltage is higher than a selected upper limit, and decreasing the first electric power when the bias voltage is lower than a selected lower limit (see Figs. 1 and 4; Col. 3, line 35 – Col. 9, line 54).

Re claim 14, Tamura discloses a method for processing a surface of a substrate, comprising: holding the substrate (40) on a substrate holder (4) in a chamber (101), the chamber including (101) an inner wall (not labeled); generating a plasma by supplying first electromagnetic waves with a first electric power to a gas atmosphere within the chamber (101); applying a bias voltage to the substrate by supplying second electromagnetic waves with a second electric power to the substrate holder so that the surface of the substrate is processed by charged species in the plasma accelerated by the bias voltage; controlling the first electric power to maintain the bias voltage within a selected range; and when the bias voltage is not maintained within the selected range, controlling the second electric power to maintain the bias voltage within the selected range (see Figs. 1 and 4; Col. 3, line 35 – Col. 9, line 54).

Re claim 18, Tamura discloses a method for successively processing a plurality of substrates in a chamber (101), comprising: holding one of the plurality of the substrates (40) on a substrate holder within the chamber (101), the chamber including an inner wall (not labeled); generating a plasma by supplying first electromagnetic waves with a first electric power to a gas atmosphere within the chamber; applying a bias voltage to the substrate by supplying second electromagnetic waves with a second electric power to the substrate holder so that the surface of

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the substrate is processed by charged species in the plasma accelerated by the bias voltage; depositing reaction products on the inner wall of the chamber, the reaction products deposited on the inner wall having an influence on the plasma; monitoring an, amount of the reaction products deposited on the inner wall by monitoring the bias voltage; and controlling the first electric power to compensate the influence of the reaction products, including decreasing the first electric power when an increase in the amount of the reaction products is monitored, and increasing the first electric power when a decrease in the amount of the reaction products is monitored (see Figs. 1 and 4; Col. 3, line 35 – Col. 9, line 54).

Allowable Subject Matter

8. Claims 19 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Claims 10, 15, and 21 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

10. Claims 11, 12, 19, 20, and 22 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure Hama et al. (US/5,525,159), Akahori et al. (US/6,215,087), Kotera et al. (US/6,296,946), Naito et al. (US/6,333,269), Benjamin et al. (US/6,509,542), Hirano et al.

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(US/6,528,115), Ikeda (US/6,532,796), Moise et al. (US/2003/0068846) also disclose similar inventive subject matter.

Correspondence

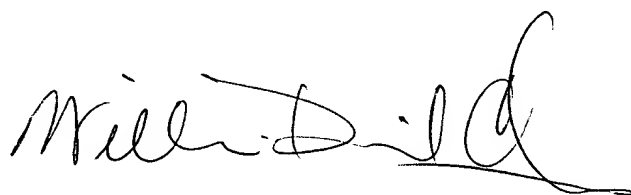
12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede

BU
June 15, 2003



W. David Coleman
Primary Examiner
Tech Center 2800